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U. S. DEPARTMENT OF AGRIC

SCAB OF CEREALS

And how to control it

Leaflet No. 426

U. S. DEPARTMENT OF AGRICULTURE

SCAB of Cereals *and how to control it*

Scab is a disease of barley, wheat, rye, oats, and corn. It attacks barley and wheat most severely. It is caused by a fungus,[1] a mold-like plant parasite, similar in nature to the fungi that cause smut, rust, and mildew in these crops.

Scab damage has been most severe in the extreme eastern parts of the Dakotas, Nebraska, and Kansas, and in the States extending directly east of these to the Atlantic. It has caused occasional losses also in some other areas.

Scab disease reduces the yield, lessens the feeding value, and lowers the quality of the cereal crops. It causes an average reduction in yield of nearly 2 million bushels of wheat per year and 1½ million bushels of barley.

The scab fungus produces a toxic substance that causes hogs to vomit after eating the grain. Horses refuse to eat scab-infected grain, but cattle, sheep, and chickens will eat it readily and are not adversely affected by it.

Scabbed wheat and barley are discounted heavily when sold on the market. The Official Grain Standards of the United States require that barley with more than 4 percent, by weight, of scab-infected kernels be designated "blighted barley."

Description of the Disease

Scab disease occurs in two phases: (1) On the seedlings of small grains as seedling blight, and (2) on the heads as head blight (often referred to simply as scab).

[1] *Gibberella zeae* (Schw.) Petch.

Seedling blight occurs either when scab-infected seed is sown or when poor, untreated seed is sown in scab-infested soil. The soil may become infested by crop residues, such as infected cornstalks or stubble, of the previous season. The scab fungus in the soil attacks the seedlings during and after germination. Frequently the seedlings are killed before they can emerge from the soil. Others grow weakly for a short period but die before reaching the tillering stage. Some infected seedlings survive but develop into weak, stunted plants that produce a low yield.

The bases and roots of infected plants show a light- to reddish-brown rot. Often infected seedlings, growing among normal plants, escape notice, and the presence of the disease is not suspected. The poor stand may be attributed to unfavorable growing conditions.

Seedling blight on wheat, barley, rye, and oats develops best in a warm, relatively dry soil—conditions that are unfavorable for the early growth of these small grains. On corn, development of the disease is favored by cold, dry soil—conditions that are unfavorable for the growth of that crop.

Head blight, the so-called scab phase of the disease, is caused by airborne spores. It may appear in the small grains at any time from flowering to maturity of the plants. The symptoms are similar on all the small grains. Infected spikelets lose their green color, die, and turn straw-colored; in barley the bases of infected spikelets frequently turn brown. A salmon-pink mold (mycelium) may appear on the chaff near the base of each infected spikelet.

The severity of the disease depends on the source and abundance of the inoculum (spores) and on weather conditions favorable to the disease. Continuous damp weather favors further development of the disease in the individual infected heads, whereas dry windy weather spreads the spores more readily to other heads.

Scabbed kernels are badly shrunken and light in weight. In wheat they are wrinkled and rough on the surface and range in color from whitish or pale gray to salmon pink. In rye they range in color from dark brown (slightly infected kernels) to carmine red (badly scabbed kernels).

In barley and oats the hulls covering the kernels make the disease less noticeable. The hulls of infected barley may

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Scobbed kernels (*lower*) and healthy kernels (*upper*) of wheat. Scabbed kernels are badly shriveled, gray or whitish in color, light in weight, ond low in milling or feeding value.

be dark-colored or light brown. The kernels underneath are a dusty-gray color and they may be shrunken and covered with a pinkish growth of fungus. In oats the hulls of infected kernels are a dirty gray color and may be partly covered by a carmine-red moldy growth or numerous black fruiting bodies (perithecia).

The scab fungus causes an ear rot on corn, usually on the tip end of the ear. The pinkish mycelium of the scab fungus spreads over the surface of the kernels and attacks the embryo ends. Cornstalks also become infected and, if they are left on the ground in the fall, black fruiting bodies (perithecia) develop. These perithecia contain the overwintering spores that spread the disease the following spring and summer.

Control Measures

Seedling blight in small grains can be prevented by sowing scab-free seed of well-adapted varieties in soil that is free from infected crop residues or in which such material has been deeply and completely plowed under.

If it is necessary to use seed containing scab-infected kernels, the grain should be put through a fanning mill that will blow out the light scabbed kernels and screen out the small shriveled kernels. The seed should then be treated with one of the effective mercury fungicides now on the market, such as Ceresan and Puraseed (dusts) and Mema, Merculine, Panogen, and Setrete (liquids).[2]

CAUTION: Fungicides are poisonous and should be handled and stored with care. Follow the manufacturer's directions *exactly*. Do not use treated seed for food or feed, and do not store it near food or feed.

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Left, A healthy head of wheat. Scab may kill only a single spikelet or part of the head (*center*), or the entire head (*right*).

Head blight, being an airborne disease, cannot be entirely prevented by an individual grower if spores are carried from his neighbors' fields. Prevention of head blight, therefore, must be a community project that calls for deep plowing under of all infected cornstalks and stubble in the area and the use of sound, treated seed of well-adapted varieties.

[2] Other good fungicides are on the market. Omission of a name from this list is not intended to be discriminatory.

This leaflet was prepared by R. W. Leukel, Crops Research Division, Agricultural Research Service. It supersedes Farmers' Bulletin 1599, Scab of Wheat and Barley and Its Control, by James G. Dickson.

Washington, D. C. Issued September 1957
Slightly revised January 1959

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GPO 867346